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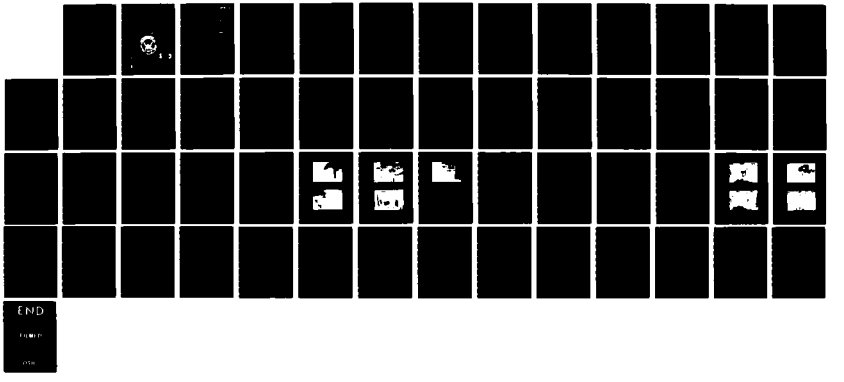

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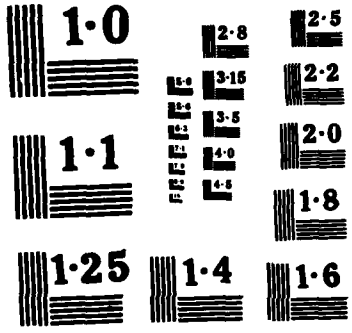

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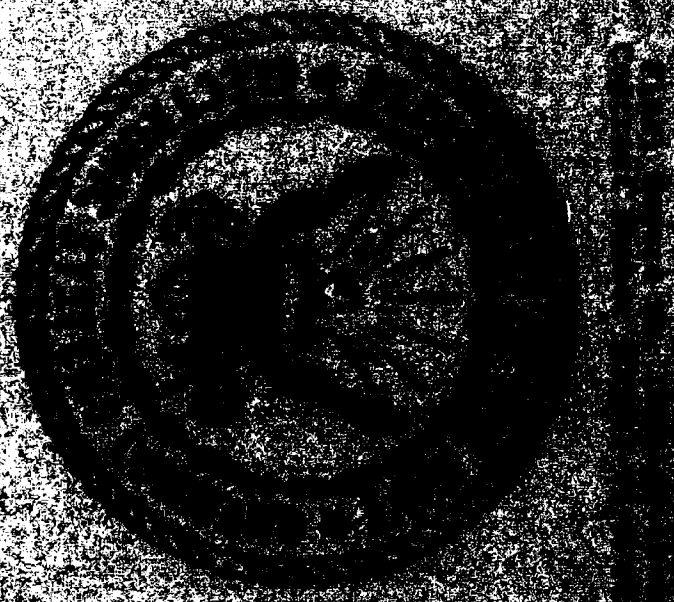

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This report documents a maintenance support analysis performed on existing intermediate maintenance activities to identify the maintenance and support policy changes, and the internal and external procedural changes necessary to institutionalize an intermediate maintenance concept for electronic equipment.

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Intermediate Maintenance Activity

Enhancement Technical Report

Accession For
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Prepared by:

E. D. Martin
Senior Analyst

Reviewed by:

P. R. Chase
Senior Analyst

Approved by:

F. J. Silvey
Senior Associate

KETRON, INC.
1725 Jefferson Davis Highway
Arlington, Virginia 22202

Prepared for:

David W. Taylor Naval Ship
Research and Development Center
Bethesda, Maryland 20084

ATTN: F. Myers, Code 1872

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1.0 INTRODUCTION

The Intermediate Maintenance Activity Enhancement Technical Report is part of a multi-phased effort to evaluate the philosophy concerning repair of electronic equipment and components and to provide guidance to improve this maintenance effort. The first phase, the development of a site survey questionnaire, was delivered to DTNSRDC under KTM 3629-A001-01 and subsequently utilized to perform the site surveys at SIMA Mayport and aboard the USS YOSEMITE. This report, prepared for the David W. Taylor Naval Ship R&D Center under contract N00167-84-0012, is the second report dealing with this subject. Attachment A provides a discussion of current IMA policy, a description of the site surveys and the results of the study. Attachment B provides the list of instructions relevant to IMAs that were reviewed as background material. Attachment C provides a list of acronyms.

2.0 SUMMARY

The IMA Capabilities Study, Attachment A, provides: a) the current maintenance philosophy, supply policy and related procedures relevant to IMAs; b) a functional flow analysis which depicts operations of both shorebased and afloat IMAs; c) procedures for induction, handling and storage of electronic items prior to screening and actual repair; and d) requisite logistic resources to support a fully institutionalized IMA concept.

This report is based, in part, on an on-site visit to the SIMA Mayport, FL and to the USS YOSEMITE (AD-19), homeported at Naval Station Mayport, FL. During the site visits both observational studies and detailed interviews with assigned Navy personnel were conducted.

Section One of the six section report is intended to provide the reader with a brief overview of the relationship between maintenance and fleet readiness. The actual site survey and the method in which it was accomplished is addressed in Section Two. Current maintenance philosophy, as defined in terms of DOD and NAVELEX policies, as well as various maintenance related special initiative programs, are covered in Section Three. Section Four of the report is devoted to the organizational structure of the subject IMA with a brief definition of each related Work Center (W/C), or division, with a supporting role in the maintenance of electronics equipment and components. Special emphasis is placed on the R-4 Division (Electronics Repair), specifically W/C 67. This section also addresses the work-load and workload process of this division. The actual site survey and the findings for each of the seven sections of the site survey questionnaire are presented in Section Five of the report, along with Conclusions and Recommendations. Section Six contains a generic Plan of Actions and Milestones required to plan for IMA support for any given electronic system or equipment.

3.0 CONCLUSIONS/RECOMMENDATIONS

The conclusions and recommendations resulting from this study are contained in Section Five of Attachment A. They are based on the finding that the three levels of maintenance are not equitably used in support of electronics systems. Emphasis has been placed on organizational and depot levels of maintenance, neglecting the resources available at the intermediate level. The intermediate level resource available is primarily calibration support and manpower. There is no evidence of other, special intermediate level resources (i.e., training, documentation, support and test equipment, etc.) put in place to support a discrete intermediate level electronic repair function. Intermediate level maintenance must be identified and planned for early in the system acquisition process, if it is to become a viable part of the three level maintenance concept.

4.0 DISCUSSION

As stated previously, Attachment A of this report provides an overview of the intermediate level maintenance facilities evaluated, both shorebased and afloat. In addition, it presents a generalized work flow description, both the internal, within the IMA, and the external environment, which is responsible for generating the IMA workload, scheduled or unscheduled. A summary of prevailing maintenance problems, as reported by IMA personnel, are also presented.

Interviews were conducted with representatives of various W/Cs concerned with the maintenance and repair of electronics equipment under the cognizance of the Naval Electronic Systems Command (NAVELEX). The survey concentrated on W/C 67 which is primarily tasked with the repair and maintenance of electronic systems and equipment, using general purpose electronic test equipment (GPETE) and automatic test equipment (ATE) in the performance of assigned tasks. Emphasis was placed on production control, precision measurement equipment (PME), calibration, supply support, micro-miniature (2M) repair and other associated areas related to the mission of W/C 67.

A scope of survey matrix is provided in figure 1. This figure provides baseline data concerning manpower available, types of ships supported, type of ATE available for support of electronic systems, and other facts relevant to the survey.

Data were gathered by two interview teams consisting of two interviewers each. However, the survey of the afloat IMA was conducted by one interview team. Each survey team performed separate and private interviews in an attempt to gather the maximum amount of independent data with the widest variety and number of inputs possible, within the time alloted. Interviews were conducted with supervisors, operators and technicians of all paygrades and specialty NECs.

TYPE OF ACTIVITY	NUMBER OF INTERVIEWEES	TYPE OF SHIPS SUPPORTED	TYPE OF ATE ON BOARD	DATE OF SURVEY	NUMBER OF DAYS OF SURVEY	INTERVIEWERS
SIMA Mayport R-4 Division	20	CV, ATF, MSO, YTV, DDG2, FFG, CG 19, DDG38, FF, Coast Guard	GENRAD (AN/USM-465) 3 Phoenix 530 DIMOTE	11-14 FEB 1985	4	4
USS YOSEMITE (AD-19) R-4 Division	7	Same as above less Coast Guard	GENRAD (AN/USM-465)	15 FEB 1985	1	2
MOTU	1	Same as above less Coast Guard	NA	13 FEB 1985	1	3
RSG	5	Same as above less Coast Guard	NA	14 FEB 1985	1	4

FIGURE 1
SCOPE OF SURVEY MATRIX

During each interview, an individualized perception of the electronic repair cycle was sought, while remaining within the guidelines of the site survey questionnaire. In addition to questions taken directly from the questionnaire, the interviewees were asked to state what support areas, in their opinion, could be readily improved upon. To put these opinions in perspective, the team collected background data regarding the interviewees training, years of experience and general educational background. The survey team also had ample opportunity to collect observational data, and photograph selected activities and equipment, while seeking general information regarding the W/C. The field notes were refined and expanded by the survey team members and existing ambiguities were resolved or reopened for further discussion and final resolution.

The goal of the survey was, from its inception, to provide a generalized description of IMA operations and problems as they existed at the time of the site survey. Due to the large number of IMAs in operation throughout the Navy, this effort represents a relatively small sampling of the total IMA effort. However, it is believed that the findings are a valid indication of major problems affecting the functions and capability of IMAs in general, as it pertains to electronics repair.

ATTACHMENT A

IMA CAPABILITIES STUDY

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EXHIBITS

1.0 INTRODUCTION

The stated long-term strategy of all U.S. Navy maintenance programs is to maximize the operational availability (A_o) of naval equipment and systems by: 1) increasing overall reliability, and 2) decreasing downtime due to maintenance and supply. Gains from this strategy have become difficult to realize in recent years because of the dependency on, and complexity of, electronics in modern weapon systems and associated items of support. These factors have been further compounded by increasingly restrictive military budgets.

As a direct result of these factors, the Navy has found it necessary to concentrate an even greater portion of its available assets on attempts to maximize total maintenance effectiveness. Economical use of maintenance assets becomes extremely critical when state-of-the-art systems and equipment become increasingly vulnerable to subtle modes of failure. Maintenance problems are most critical in weapon systems that become inoperable by the failure of a single electronic component.

As fleet modernization continues and new systems are introduced it will become mandatory for fleet acquisition managers to implement programs that effectively manage such critical assets as maintenance planning, supply support, manpower, support equipment, and training to ensure that all maintenance and support requirements are addressed in the early stages of system and equipment acquisition.

2.0 SUMMARY

This report, based, in part, on data gathered during a five day, on-site survey at SIMA Mayport and aboard the USS YOSEMITE (AD-19), is an attempt to identify maintenance policies and procedures that are prevalent in the fleet today. The specific purpose of the survey was to collect data concerning maintenance policies and procedures in effect at two selected intermediate maintenance activities. Attention was focused on internal and external interactions that embody the total working environment of an IMA.

The results herein are based upon a survey questionnaire administered to a broad cross-section of managers, supervisors and maintenance technicians. The interviews were conducted in the actual maintenance spaces. The interviewees were randomly chosen with the cooperation of the repair officer, division officer and the W/C supervisors.

The interview team was allowed to pursue any issue to the fullest extent. It is noteworthy that from comments received, this appeared to be the first study of its type. All interviewees responded in a candid manner, providing valuable insight pertaining to electronics maintenance at IMAs today.

3.0 CURRENT MAINTENANCE POLICY

This section provides background information to acquaint the reader with current fleet maintenance philosophy, policies, and programs in order to better understand the environment in which the activities surveyed normally operate.

3.1 DISCUSSION

The basic philosophy which establishes the three general categories (levels) of maintenance and repair has been promulgated by the Department of Defense (DOD) and further amplified, or modified by the various Naval Systems Commands to meet specific needs. The DOD and NAVELEX definitions are discussed in the following paragraphs.

3.1.1 Department of Defense (DOD) Maintenance Policy

It is the intent of DOD to invoke a broadbased maintenance policy that provides optimum utilization of manpower, facilities and material which should derive the most cost effective approach to accommodate a wide variety of recurring maintenance needs. Accordingly, all maintenance activities are categorized into three levels: Organizational, Intermediate and Depot. The formal definitions of each of these categories are:

- Organizational Level Maintenance: That maintenance which is the responsibility of, and performed by, a using activity on its assigned equipment. This is generally construed to be tasks such as: inspecting, servicing, adjusting minor repairs and the replacement of minor parts, assemblies and subassemblies.

- Intermediate Level Maintenance: That maintenance which is the responsibility of, and performed by, a formally designated activity whose specific mission is the direct support of user organizations. The tasks normally assigned to an intermediate activity are: the calibration (primarily end items of general purpose support equipment), repair and/or replacement of damaged or unserviceable parts, components, or assemblies; the emergency manufacture of non-available parts; and providing technical assistance to using organizations.

- Depot Level Maintenance: The primary mission of an authorized depot activity is to provide the total range of engineering and support services required for cost effective management and recovery of assets. This level of maintenance and engineering effort applies to end items, assemblies, and subassemblies, as well as bit and piece parts. It

includes the manufacture of, modification to and the testing/reclamation as required, of those items of supply for which this service has been determined to be economically desirable.

3.1.2 Naval Electronic Systems Command (NAVELEX) Maintenance Policy

The overall guidance concerning maintenance of systems and equipment under the cognizance of NAVELEX, which is specified in NAVELEXINST 4700.13 (series), is in consonance with DOD directives and serves to further refine these general guidelines in an effort to address fleet requirements. For purposes of comparison, the following NAVELEX definitions are paraphrased, as follows:

- Organizational Level: The lowest (least comprehensive) echelon of maintenance which is performed by an operating activity or command utilizing its own assets such as manpower, equipment and facilities. This work is normally limited to installed equipment utilizing built-in-test and/or general purpose electronic test equipment (GPETE) and maintenance diagnostic techniques. This primary maintenance is necessarily limited to fault isolation, removal/replacement of an integral unit (i.e., module, printed circuit board, etc.) and on-line verification of repair actions. The scope of this maintenance level is confined to elements of the operating forces such as FFs, FFGs, DDs, DDGs, CGs and the various support craft.

- Intermediate Level: The next higher echelon of maintenance is performed by: 1) Tenders and repair ships; 2) ship repair facilities (SRFs) and SIMAs; and 3) major combatants such as CGs or CVs. The mission of an IMA is the performance of secondary maintenance in direct support of organizational activities which consists of fault isolation and repair at the piece part level on printed circuit boards, modules, and subassemblies, as well as that maintenance required on larger end item units. Intermediate level maintenance also includes the repair and calibration of general purpose electronic test equipment (GPETE) under the control of the MEASURE program. Maintenance within an IMA is normally performed using a complete prime system, as a hot bench standard, in conjunction with a wider range of GPETE than would normally be available to fleet activities or by utilizing the growing range of automatic test equipment (ATE) that is available at the intermediate level for fleet support.

- Depot Maintenance: The highest echelon of maintenance capability. This level includes manufacturing and reclamation services in addition to the maintenance capability found at the lower levels. These activities, not under the budget constraints often experienced by lower levels, are often commercial entities under government contract for repair as well as manufacture. These sites are in addition to the standard organic overhaul facilities owned and operated by the U.S. Government. The capital investment associated with establishment of these facilities tend to limit their proliferation regardless of capability.

3.2. MAINTENANCE RELATED SPECIAL INITIATIVE PROGRAMS

For a number of years, significant efforts have been devoted to developing a formula which would improve total support and achieve desired levels of fleet material readiness. These special initiatives which specifically address operational readiness, extended operational cycles of ships and ultimately the total material readiness condition, are under the cognizance of PMS-306. This action has caused several independent special initiative programs, such as the Engineering Operating Cycle (EOC), IMA Upgrade Program, and the Guided Missile Frigate (FFG-7) Class Support Program, to be compressed into a general program called the Ship's Support Improvement Program (SSIP). The primary mission of the SSIP is to analyze and develop a comprehensive maintenance system for all Navy surface vessels regardless of class or type. While each of these specific programs have individual merit, they primarily address much larger areas that extend beyond the scope of this investigation and with the exception of the IMA Upgrade Program will not be addressed herein.

3.2.1 IMA Upgrade Program

This element of the SSIP is intended to improve the Navy's total support posture by meeting maintenance requirements for existing systems/equipments and future acquisitions. The scope of the upgrade program involves the modernization and improvement of both shore and afloat IMA facilities with a focus on increasing total capability, improving workloading and focusing attention on personnel training. As a baseline, the program includes a major effort to assess current and out-year test equipment requirements that more adequately address the range of discrepancies and malfunctions that occur in fleet systems and equipment. An additional effort is underway to examine the economic feasibility of off-loading overflow onto commercial resources in close proximity to naval facilities.

3.2.2. Support and Test Equipment Engineering Program (STEEP)

STEEP, a program under the cognizance of NAVSEA, is an integral part of the IMA Upgrade Program with the specific objective of establishing requirements for and implementing a comprehensive ATE program that will more adequately address fleet requirements. Due to the fact that past maintenance policies have not stressed maintainability or testability to any significant degree, the STEEP program has been designed as a multi-phase program with built-in safeguards that encourage periodic evaluations to permit total abandonment or expansion and acceleration, as the individual case dictates. STEEP is designed with four specific phases that provide for: 1) requirements analysis, 2) facility workloading, cost effectiveness and policy formulation, 3) implementation, which includes test program set (TPS) development, and 4) additional ATE and TPS development efforts. The phased approach was used to ensure orderly implementation and more effective utilization of dollars and time.

Phase One of STEEP sought to introduce a relatively new maintenance philosophy and determine its feasibility. A result of this phase was the recommendation to establish a pilot I-level EM/PCB screening facility on both east and west coasts. This phase also encompasses the establishment of a maintenance software center.

The second phase of STEEP, the Cost Effectiveness and Policy Formulation phase, encompassed a study of the particular Unit Under Test support posture; the formulation of new maintenance concepts; and implementation of pilot intermediate level facilities to support the newly acquired ATE capability.

Phase Three of the STEEP project involved the generation of Requests for Procurement (RFPs) to private industry for the development of the ATE hardware and a complete spectrum of TPSs necessary to execute the program. An extremely critical element of this phase was the re-evaluation of the policies governing assignment of Source, Maintainability and Recoverability (SM&R) codes. The restructuring of the SM&R code assignment policy and the resultant application to new and existing systems or equipments has a major impact on current supply and the maintenance philosophies that are resident in the fleet at this time.

The fourth and final stage of STEEP is the actual acquisition of the required ATE for the various levels of maintenance and the orderly transition to a full scale, three-tiered program. The transition program includes all the safeguards necessary for configuration management, control and standardization of the end items of ATE and the related software that forms the nucleus of the STEEP TPS development program.

4.0 INTERMEDIATE MAINTENANCE ACTIVITY OPERATIONS

This section provides an in-depth review of current maintenance procedures, practices and methods of conducting business on a day to day basis. An overview of all activities associated with the conduct of intermediate maintenance is provided to give the reader an opportunity to view the complete repair cycle.

4.1 INTRODUCTION

Having delineated the DOD and NAVELEX policy for the three levels of maintenance, it is necessary to assess how this policy is being implemented. To accomplish this effort, it was determined that a site analysis be performed on existing intermediate level maintenance activities. It was imperative that the activity chosen for the analysis provide the broadest possible mix of support activities, new/old maintenance philosophies and have a reasonable cross section of support demands dictated by the proximity of fleet users.

With the above criteria established, the Naval Station Mayport, Florida was chosen as the site for the initial assessment of maintenance capabilities of a shore based intermediate activity. The fact that the Mayport Basin not only presented a nearly complete cross section of fleet users and equipment (i.e., CVs, CG, FFGs, FFs, DDG etc.), it also provides the opportunity to evaluate an afloat intermediate maintenance activity, the USS YOSEMITE (AD-19), homeported at Mayport.

SIMA Mayport was not only chosen on the basis of demographics, but equally important was the fact that this SIMA facility was designed from the ground up to provide support for resident fleet activities. An additional factor in choosing Naval Station Mayport was the recent introduction and establishment of the support capability for the AIMS MK XII IFF system which represents a major departure from the traditional approach to three levels of maintenance for electronic equipment. This expanded intermediate level support capability was planned and put in place to support a revised maintenance plan by external interest groups (i.e., SEA 91AD121 (formerly PMS 306), ELEX 824, and NESEA 0213).

4.2 SIMA MAYPORT ORGANIZATION

The basic concept and organization of the intermediate maintenance activity at SIMA Mayport, as well as its specific mission, is delineated in TYCOM instructions, and SURFLANTINST 9000.1A. These instructions provide specific direction and serve as the founding documents and charter for Atlantic Fleet (SURFACE) Maintenance.

While this report will concentrate on the R-4 (Electronics Repair) Division, specifically W/C 67, it will address other entities that play a vital role in the conduct of maintenance and repair of all systems and equipment under the cognizance of NAVELEX.

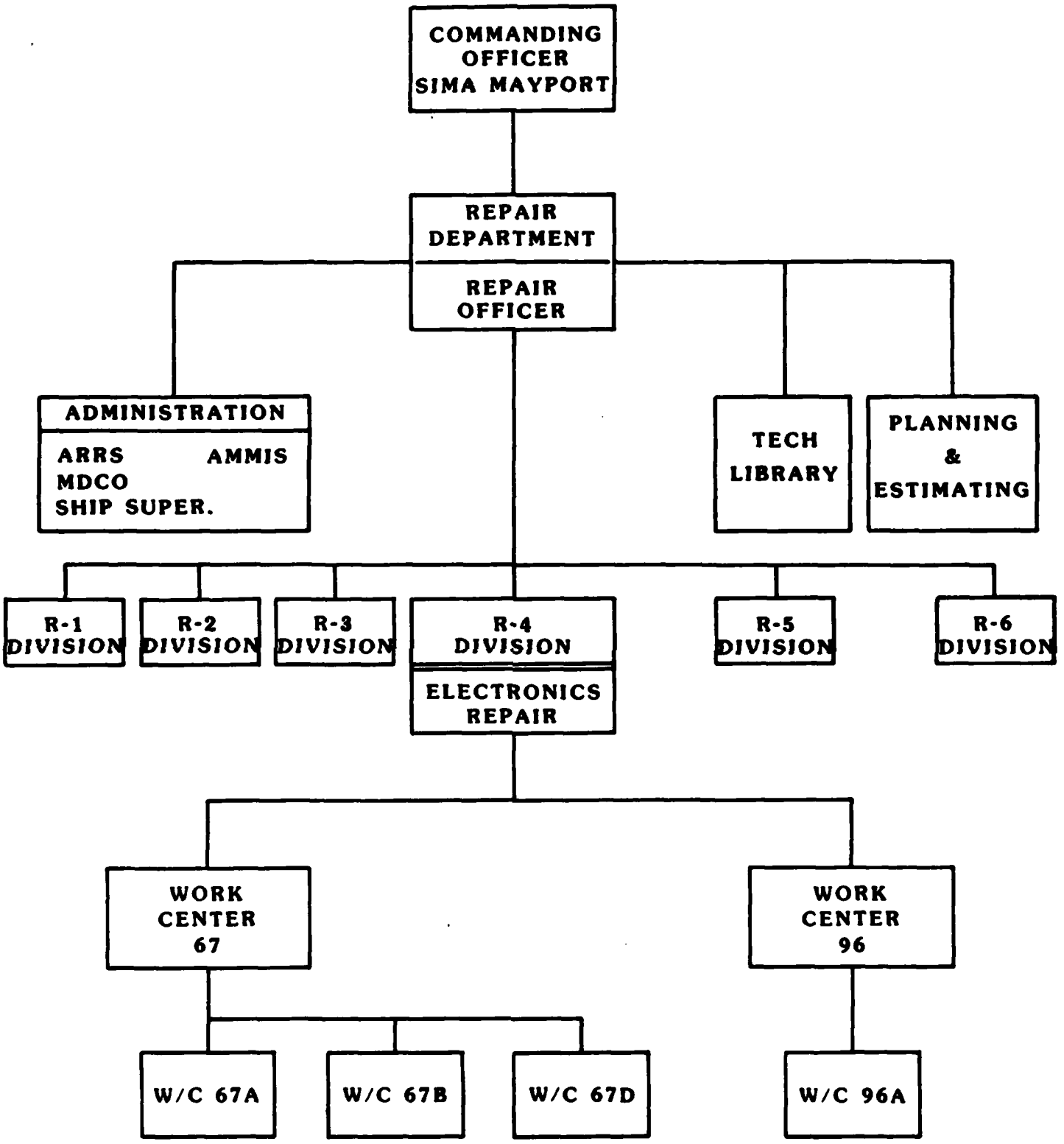


FIGURE A-1

ORGANIZATIONAL STRUCTURE OF SIMA MAYPORT

Figure A-1 depicts the organizational structure of SIMA Mayport with particular emphasis on the Repair Department. A cursory review of this chart will indicate that the function of electronic repair represents only a small portion of the total SIMA workloading and capability package. The preponderance of the overall workload for the SIMA would appear to be one of maintenance and repair of systems and equipment in the general classification of Hull, Mechanical and Electrical (HM&E) equipment.

4.2.1 Repair Department

This department has the responsibility for the documentation and support to all repair divisions within the SIMA. The administrative tasks of workload planning, estimating, documenting, scheduling and providing appropriate technical documentation support are performed by sub-divisions or sections of this office. This division is made up of the following entities whose specific roles will be examined in following paragraphs: 1) Repair Office (Administration), 2) Planning and Estimating, and 3) Technical Library.

4.2.1.1 The Repair Office (Administration)

The Repair Office, as established at SIMA Mayport, is the focal point of all planning, scheduling and data collection necessary to accomplish the mission prescribed. In addition to direct customer liasion established through the Ship's Superintendent Section, this office also manages and supports customer interface by managing the central repository for the Maintenance Data Collection System (MDCS), the Current Ships Maintenance Projects (CSMP) for ships under the SNAP program through the Intermediate Maintenance Management System (IMMS), and a centralized computer data base for workloading of the total IMA.

This office, through the Ships Superintendent Section, establishes direct contact with the customer activity to plan and coordinate all activity scheduled for completion during Intermediate Maintenance Availability (IMAV) periods and ensure accomplishment of the required maintenance actions set forth in the CSMP.

The responsibility for maintaining the MDCS has been assigned to the Analysis Records and Reports Section (ARRS) which is part of the Repair Office. This section is charged with providing maximum visibility for all data connected with the centralized processing and computer programs which project the workload contained in the CSMP for ships under the SNAP program.

The section within the Repair Office having the singular responsibility for the flow and control of all MDCS documents relating to the CSMPs and IMMS is the Maintenance Document Control Office (MDCO). The MDCO is currently in the process of developing an Area Maintenance Management Information System (AMMIS) which is intended to provide a single point of entry into a master data base containing the complete maintenance requirements for all activities in the supported area, such as the Mayport Basin.

4.2.1.2 Planning and Estimating (P&E)

This division, with direct responsibility to the Repair Office, is composed of senior, experienced personnel with the specific responsibility of planning and estimating all elements connected with the full spectrum of tasks that comprise the capability of the SIMA. It is the responsibility of the P&E section to screen the individual capabilities of each repair center, assign job control numbers and manhour estimates, determine availability of materials and resources to complete each job, provide data necessary to complete the job in a work package format, and schedule each job with regard for individual W/C loading.

4.2.1.3 Technical Library

The technical library, under control and management of the Repair Officer, is the central repository for all data, drawings, etc. required for performance of the IMA mission. This section, a critical element in the accomplishment of the total mission, maintains necessary information pertinent to any system such as military specifications and standards, cross references, indexes and other data essential to the maintenance and repair of a wide variety of equipment. These data are available to W/C technicians in a variety of formats such as microfiche, aperture cards, etc.

4.2.2 Electronics Repair Division (R4)

This section is intended to acquaint the reader with the basic functions and responsibilities that define the mission of the R-4 Division. It is made up of several distinct W/Cs under the primary control of W/C 67. In addition to electronic repair, the mission of this W/C includes the repair and calibration of standard electronic test equipment.

W/C 67 is best defined as the W/C that is responsible for both inside (SIMA shop spaces) and on-site (aboard ship): testing, adjusting, repairing, and calibrating miscellaneous electronic equipment related to radar (navigational and search) and associated hardware such as installations, wave guides and antennas, IFF equipment, navigation aids such as TACAN, LORAN, and Radio Direction Finder (RDF), general purpose computers, communications equipment (UHF and VHF) and GPETE. These functions are generally performed in assigned spaces designed and equipped specifically for electronic repair and maintenance. The actual maintenance is performed by trained electronic technicians using a combination of standard hand tools, portable electronic test and measuring devices and an assortment of hot bench set-ups that simulate or duplicate complete functional systems which serve as shop standards. For a relatively small segment of equipments, primarily digital applications, the technician also has a variety of relatively unsophisticated ATE available to aid in fault isolation and diagnostic routines. The ATE is a recent addition to the list of equipment available for troubleshooting more advanced systems, consequently, the range of applications is very limited.

This W/C also has the capability to screen, diagnose, and repair and/or rebuild complex miniature electronic assemblies such as printed circuit boards and modules utilizing a state-of-the-art microminiature (2M) repair station.

W/C 67 is divided into several sub-work centers having distinct responsibilities and areas of specialization. W/C 67A has primary responsibility for the repair and maintenance of electronic equipment commonly found aboard ships, while W/C 67B has been established as the Fleet Electronic Calibration Laboratory (FECL).

W/C 67B, with calibration standards having traceability to the National Bureau of Standards, provides fleet support for the calibration and repair of both general and special purpose electronic test equipment. The calibration laboratory, organizationally a part of W/C 67, and located in the same building, shares common access spaces but is a controlled access area not considered to be part of the general repair facility operated by W/C 67. The equipment with which the laboratory is furnished is not available for use in any effort other than calibration. The equipment utilized to repair faulty items that have been included for calibration services is common equipment shared with the normal maintenance functions performed by W/C 67A.

The remaining component of W/C 67 is W/C 67D which is responsible for all repairs and maintenance performed on shipboard teletype equipment which includes printers, keyboards, tape punchers and related accessories.

4.3. IMA WORKLOADING

The work performed by an IMA generally falls into one of two categories, scheduled or unscheduled. The basic decision of what specific work is to be performed by an IMA will normally meet the following criteria:

1) A maintenance requirement which is beyond the capability of the ships work force because of a technology gap or physical constraints.

2) A maintenance requirement that is beyond the capability of the ships workforce because of personnel limitations (e.g., manning levels, training or lack of specific skills).

3) A maintenance requirement due to an unfavorable time factor resulting from deployment cycles, etc.

4) A maintenance requirement for which the activity does not have the required special tools or necessary equipment.

4.3.1 Workloading - Scheduled

The scheduled workload for an IMA is directly related to that work scheduled by the TYCOM in the quarterly scheduling of ships for IMAV. Ships are assigned IMAV periods with the objective of accomplishing the maximum maintenance and repair in the time alloted. The IMAV is normally a three to four week period prior to or following an extended deployment, during an overhaul or yard period, or during a selected restricted availability (SRA) period at a shipyard for accomplishment of ship-to-shop work.

The workload to be accomplished during these IMAV periods is generally what is contained in the individual ship's CSMP and priortized based on mission essentiality, funding and resource availability.

In addition to the scheduled workload provided by the quarterly IMAV scheduling report issued by the TYCOM, the requirements for test equipment calibration is a major component of the scheduled workload at those IMAs having a Fleet Electronic Calibration Laboratory capability

4.3.2 Workloading - Unscheduled

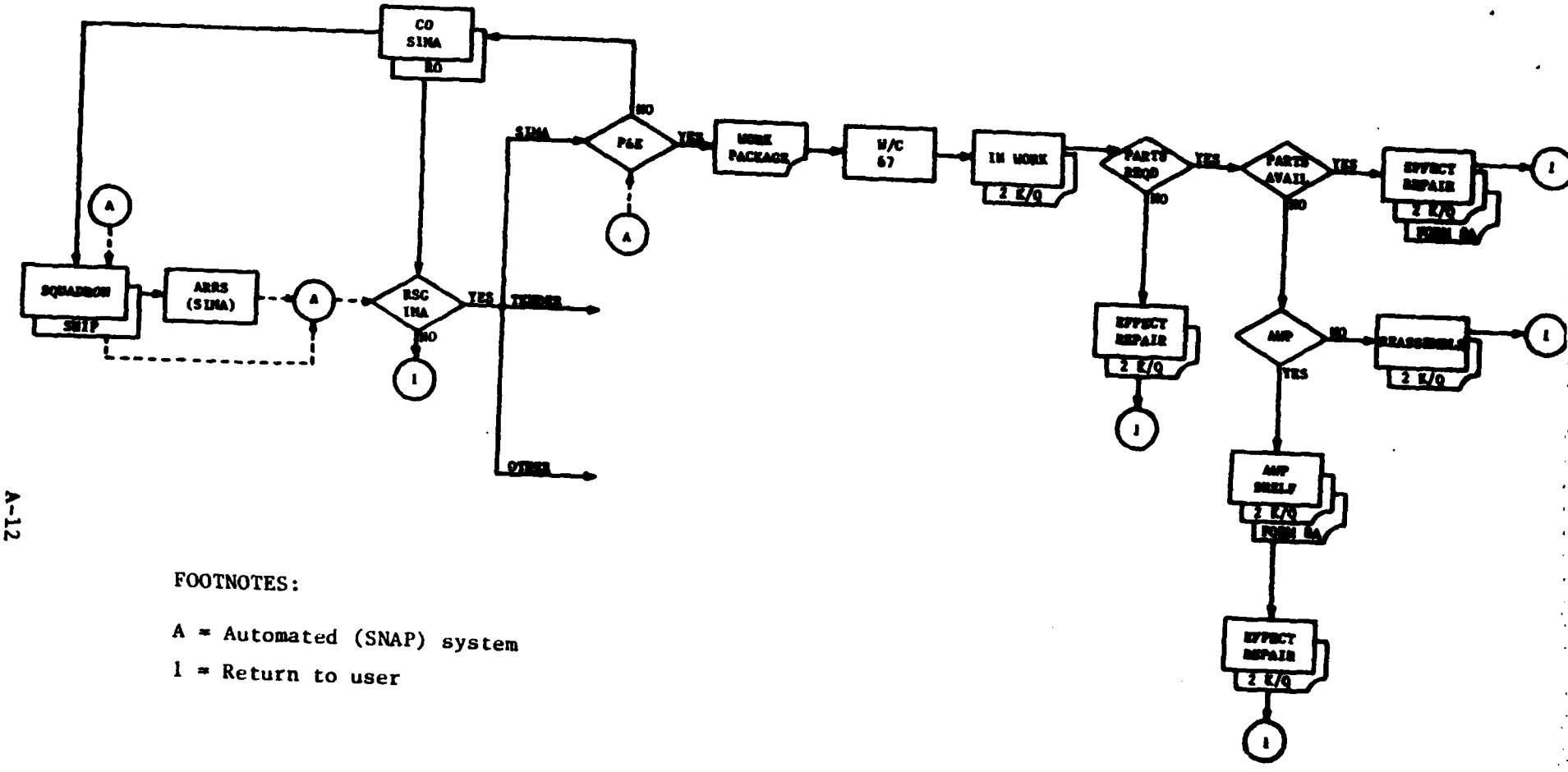
Due to a lack of specific guidance or firm maintenance policy governing the level of repair which may be attempted and/or accomplished by an organizational level activity, it is extremely difficult to accurately depict the unscheduled workloading policy for an IMA.

The unscheduled workload consists primarily of actions to meet requirements presented by fleet activities to satisfy emergent maintenance needs. The requirement for the maintenance action is documented on a standard maintenance action form, OPNAV 4790/2K or OPNAV 4790/2Q for those ships under the SNAP program for automated maintenance action tracking. This form is required for all maintenance actions accomplished by the IMA.

The process to obtain IMA assistance for accomplishing a maintenance action is depicted in figure A-2 and explained as follows:

1) The user activity first fills-out an OPNAV 4790/2K form and brings it to ARRS, where it is entered into the IMA computerized data base. ARRS controls the flow of all documentation within the IMA. The document then comes under the cognizance of the MDCO which has control of all MDCS documentation and serves as the central point of contact for matters related to the maintaining of CSMP/IMMS central files.

REPRODUCED AT GOVERNMENT EXPENSE



FOOTNOTES:

A = Automated (SNAP) system

1 = Return to user

FIGURE A-2

PROCESS TO OBTAIN IMA ASSISTANCE

2) After the data are entered into the data base, the information becomes available for use by the TYCOM Representative (Readiness Support Group-RSG), the Squadron - Intermediate Unit Commander (IUC) and the SIMA P&E Section. As shown in figure A-2, this data availability is denoted by the symbol (A). For those ships under the SNAP program, the first step is avoided, for as soon as a ship enters a request into the data base, it automatically appears at the previously mentioned centers. This approach is denoted in the figure by a dotted line.

3) The primary use of this data is for effective planning, management and control of assets and workload by the Squadron, RSG and P&E. In addition, RSG screens the data to determine if a local organic capability exists to accomplish the required task or a different source must be sought. If these options are unavailable, the user is so notified and the request is turned-down. At this point, the options are the SIMA, a tender (if in the vicinity, at the time), other Navy facilities, and contractors.

4) Should the SIMA be chosen to perform the task the ARRS will generate and print work loading information which is forwarded to the P&E section. The P&E section then evaluates the raw data package and executes the planning and estimating functions which leads to development of the Automated Work Request package and assignment of the standard Engineering Time Value (ETV) factor. The ETV factor assigned is based on the average time necessary to complete the job and is used to control W/C loading.

5) Upon acceptance of a work request by the SIMA P&E Section, a work package is prepared and passed to the appropriate W/C for completion. A "rejected" work request, a job for which the SIMA does not currently have the capability (i.e., workload does not permit, etc.) is passed up the chain-of-command from the Repair Officer to the SIMA C.O. for his review and concurrence. The "rejected" work request may be resubmitted to RSG for re-assignment to a different maintenance facility, or is returned to the user (requesting activity) for action.

6) Once assigned the work, personnel from the W/C may pick-up the equipment or have the item delivered to the W/C by ship's personnel. From this point forward, paperwork always accompanies the item under repair.

7) W/C personnel then inspect the item and determine if parts are required to complete the repair action. If no parts are required, the work is performed, the paperwork is completed and the item is returned directly to the user. If parts are required, W/C personnel determine whether they are available or not.

8) If the required parts are available, the W/C performs the repair, completes the paperwork (including form 8A to account for parts usage) and returns the item to the user. If parts are not available, lead-times are assessed to determine the impact on the user's operational requirements. If lead-times are determined to be unacceptable, the item is reassembled and returned to the user. If awaiting parts lead-time is adequate, the item is stored in an awaiting parts status. The work will be completed upon receipt of the required part(s). Upon repair, the item is returned to the user.

Workload processing for an afloat IMA (tender) is essentially the same. A work request is directed by RSG and the tender's P&E section and appropriate W/Cs schedule induction, effect repair and complete the required documentation.

4.4 MOBILE TECHNICAL UNIT (MOTU)

The mission of the MOTUs is to provide technical assistance and training. MOTU is chartered to provide this service on a "where and when needed" basis to fleet activities, regardless of deployment posture. MOTU responds to fleet needs in highly technical areas through direct customer assistance in the form of OJT and specialized classroom instruction. These areas include electronics, ordnance, fire control, sonar and data systems equipment. MOTUs provide a unique level of technical expertise not normally resident in operating activities.

The MOTU does not require the 3M paperwork and normal decision process required of the IMA to initiate a repair assist action. This ease of soliciting MOTU assistance and the promptness of response favors the user going directly to the MOTU, bypassing the avenues for obtaining support available via the IMA.

5.0 THE SIMA SURVEY

As previously stated, a survey of an established SIMA was conducted to review the basic logistic resources necessary for the effective support of modern electronic systems. As such, this survey concentrated on those systems, equipment and facilities under the cognizance of NAVELEX, specifically W/C 67 and areas related to this W/C. The logistic resources that were evaluated were categorized into seven basic elements and the survey questionnaire addressed each of these elements, both independently and in the aggregate.

5.1 SURVEY SECTION ONE - MAINTENANCE PLANNING AND TECHNICAL DOCUMENTATION

This section of the survey deals with the maintenance planning and technical documentation available to the IMA personnel which

enables them to provide a requisite level of support for fleet equipment. It addresses the management and work flow processes within an IMA to evaluate the overall capability and effect maximum utilization. Efforts were made to identify the specific items that constitute the workload and determine if the support capability at the SIMA actually met user requirements. These items included calibration, test equipment repair, antenna repair, and AIMS MK XII system/component repair. Questions in the survey targeted use of a master repair capabilities list and the impact of SM&R coding on the development of this master list. Other questions attempted to determine the role that a IMA plays in the logistic planning for new systems/equipment being introduced into the fleet.

The survey results indicated, without exception, that there is no identifiable planning involved in establishing an intermediate level electronics repair capability. However, it must be noted that this condition is not the fault of the site evaluated; it is due to the lack of an institutionalized intermediate level maintenance concept. There does not appear to be any specific policy that directs the flow of retrograde electronics material from operating activities into an intermediate facility. When a repairable item fails in the fleet, it immediately re-enters the supply system without a preliminary screen by an IMA to verify the fault or to attempt local repair.

Under the present system of accounting, and IMA must "BUY" retrograde material from the supply system, repair the item with IMA operating funds, and then "SELL" it back to supply as a ready for issue (RFI) item. The RFI item is "sold" for the same price it was "bought". There is no pay back for the funds expended to effect the repair. When an item is repaired that has been inducted by a fleet activity, all repairs are charged to the user activity funds without any expense being incurred by the IMA.

When attempts were made to correlate actual repair capability of the R-4 Division to a master repair capabilities listing, the interview team learned that there was no "formal" listing established for the SIMA. However, there is an informal listing prepared by the W/C supervisor, the Master Repair Capabilities Listing. This local listing is only promulgated through personal efforts of individuals assigned to SIMA, Mayport via Pre-IMAV meetings, division memorandums, personal ship visits, and word-of-mouth.

The locally prepared Master Repair Capabilities Listing is compiled without regard for the SM&R codes assigned to individual components or systems and is based on a composite of experience, the existence of special, locally fabricated hot benches and present NEC manning levels. The list does not reflect the entire range of equipment in use by the fleet. Additionally, it is difficult to determine if a specific item in on the list. Based on inputs from the personnel interviewed there are a large number of systems and components in the fleet that could be considered IMA repairable, but

never appear on the repairable items listing. Further, the list is not categorized in a top-down indentured fashion. It may list a system but not its components, may list components but does not identify the components to a system, and may list a sub assembly without specifing whether the circuit cards of this sub assembly can be repaired at the IMA. For instance, a circuit card may not be listed but may in fact is repairable at the IMA. Note, however, that the existing repairables list is an excellent first attempt to promote the advertisement of IMA capabilities. The capability listing represents a close approximation of the cross-section of the types, models and classes of ships supported from the Mayport Basin.

Elements in the screening cycle external to the SIMA, specifically the Readiness Support Group, indicate that the work request OPNAV (4790/2K) screening process occurs without using the Master Repair Capability Listing published by SIMA Mayport (W/C 67).

Questions from the survey dealing with maintenance plans, a document normally used to translate the maintenance approach into a set of task requirements to support and maintain an item, went unanswered. Maintenance plans, which contain the basic repairables of a system and their assigned SM&R codes, were not available for any system on the Master Repair Capability Listing. The only listings available were Allowance Parts Lists (APLs) for the various systems. These are of limited value in determining maintenance capability other than component parts identification. Other questions concerning the maintenance concept for a repairable item and how to translate this concept in terms of W/C resource requirements, were also unanswered.

The absence of a maintenance plan, or other logistic planning document, makes it extremely difficult to support a system at any level other than bit and piece-part replacement level. The APLs that were reviewed are not constructed in a top-down indentured fashion but go from the top level item, the WRA, directly into the piece-parts that make up the entire system. The APLs reviewed did not indicate the part number or National Stock Number (NSN) of the circuit cards or modules, or cite the SM&R code for any item except the top level assembly and consummable piece-parts. APLs tend to show the part number of a specific bit or piece-part such as a resistor, transistor capacitor, etc., embedded in the circuit card or module.

The technical library appeared to have a sufficient amount of technical data available to aid the technician in any repair efforts undertaken. Additionally, there were sufficient publications, procedures, parts lists, etc., in the W/C that would further preclude capability problems caused by a lack of technical data.

5.2 SURVEY SECTION TWO - MANPOWER

The purpose of this section was to determine the means of staffing, assigning, and utilizing available manpower within the SIMA.

Overall staffing of SIMA Mayport is managed in a well controlled fashion with no serious shortages were evident of either the quantity of personnel or the distribution of personnel with specific Navy Enlisted Classifications (NECs). The standard manning documents (CNP 1000/2 and CNP 1080) adequately reflect the current needs in both depth and scope of personnel to continue operation at the existing level of support demanded of this activity. The enlisted rotations appear to cause no more than minimal disturbances in division effectiveness. A possible exception is when the lost NEC is one-of-a-kind or is critical since it is required to support a majority of the W/C workload, as is the case with calibration laboratory technicians.

W/C 67 has an availability of approximately 88% of assigned manhours available for actual direct labor at any given time. The remaining portion of the assigned personnel are involved in performing the standard range of collateral duties typical of naval shore establishments.

The range of NEC codes available in the electronic technician (ET) rating, the primary source rating for this W/C, is segregated into numerous specialities, thereby creating a close correlation between the manning documents and specific task assignments. With the exception of the DS and EW ratings, which would be required to expand present capabilities, there is one additional requirement for the creation of a new NEC. The NEC 1588 is assigned to qualified/certified calibration technicians that work in W/C 67B, the Fleet Electronic Calibration Laboratory (FECL). However, calibration is only part of the W/C 67 workload. Test equipment repair is another major part. There is presently no NEC for test equipment repair technicians. At present the only method of staffing this critical W/C requirement is through OJT.

The manhour accounting system in use by the SIMA is the Engineering Time Value (ETV) system. This system has the most value in determining the productivity of a division with repetitive tasks such as the Calibration Laboratory. This is because it is built on the premise that the repair process of a specific item always takes the same amount of elasped time. When a work package is passed down from P&E to the W/C it is assigned an ETV. Should the fault isolation time, repair time, or checkout time be longer than alloted, the W/C supervisor must negotiate for the additional hours with the P&E section.

5.3 SURVEY SECTION THREE - TRAINING

The purpose of this section was to determine who is responsible for training, what is the most frequently utilized method of

training, whether training was responsive to fleet/IMA requirements and ultimately to determine the impact of training on the mission of the IMA.

The training cycle of the average ET, the primary rating in W/C 67, starts with the traditional class "A" school, which is a mandatory requirement for this rating, followed by a class "C" school which earns a specific assignment NEC. It is normally only after completion of a sea tour that an ET is assigned to an IMA. As indicated, all training is accomplished by formal classroom schooling with experience being gained through continual OJT. If a prospective personnel assignment does not have the sufficient training or NEC for a billet, the type commander may authorize a delay in reporting. The person will be given specialized training at a class "C" school and a new NEC.

The other training utilized by the W/C is the Micro Miniature (2M) Repair training offered by the MOTU. This training is generally available on an as needed basis with re-certification training given at regular intervals.

The personnel interviewed were well trained and motivated and capable of performing assigned tasks. Adequate training for the NECs assigned to the SIMA was provided.

5.4 SURVEY SECTION FOUR - SUPPORT AND TEST EQUIPMENT

It was the function of Section Five to determine the support posture of the IMA in terms of available support and test equipment. Questions addressed standardization, allocation, procurement and management of support and test equipment.

The range and depth of the GPETE held by W/C 67 is for all practical purposes dictated by the systems supported by the facility and delineated in the Ships Portable Electrical/Electronic Test Equipment Requirements List (SPETERL). The SPETERL listing is tailored to each individual IMA. The equipment list generally matches the equipment requirements list in a specific system technical publication such as a maintenance manual, and is listed by SCAT code which provides a cross-reference for like items of equipment should the gear specified in the manual not be available. The range of equipment in custody is adequate for the current mission with only minimal delays caused as a result of sharing equipment. However, an increased workload would definitely cause delays because of the limited quantities of any given support and test equipment end item.

It was noted that GPETE is not normally made available to an IMA on a "push" basis but must be purchased with SIMA operating funds if a new or replacement piece of equipment is required. There is no apparent initial outfitting procedure to support newly acquired, or about to be acquired, system repair capability.

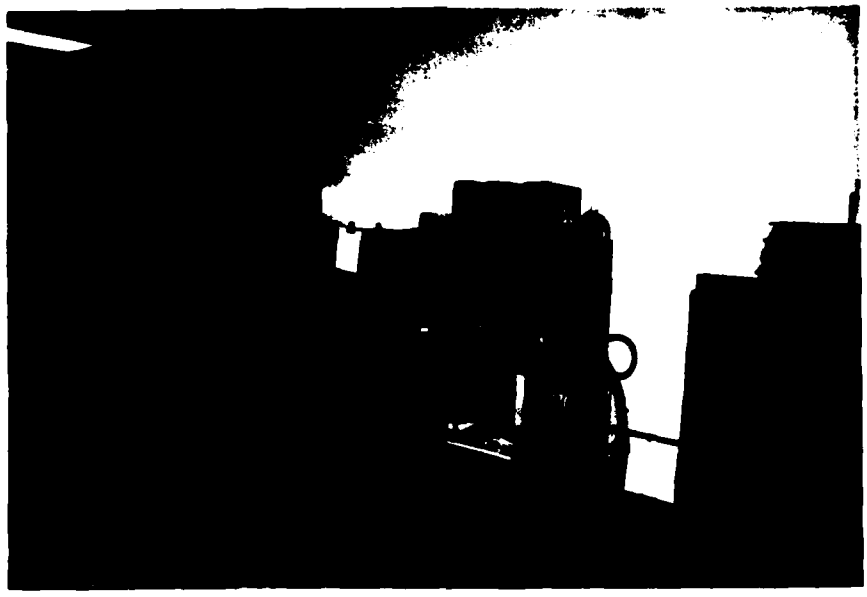
With the exception of the ATE, which supports only a fraction of the W/C 67 workload, it was noted that support equipment consists primarily of GPETE and hot benches. Hot benches are not support equipment but are fabricated for a particular site as a self-help effort. In several cases the hot bench components in use had been destined for official survey as excess property prior to being given new life by enterprising individuals. The IMA enjoys little advantage over shipboard electronics capability in terms of special support equipment. The IMA does enjoy additional workspace.

The ATE assigned to the IMA is generally under utilized. The ATE program does not specifically address the needs of the IMA, and personnel at the IMA are not certain of the direction of the program nor how equipment are selected for TPS development, etc. Even for those repairable items (printed circuit boards, modules) for which TPSs are developed, there is no institutionalized procedure for inducting these items into the IMA for check-out, test, and/or repair. With a low throughput of items caused by the mandates of existing supply and maintenance policies and procedures, it is highly unlikely that the IMA will ever receive a measurable amount of workflow in this area, until these policies and procedures are changed. A major reason for this is that the equipment in place at the IMA is the same as at the organizational level. Having the GENRAD (AN/USM-465) and the TPS at the organizational level as well as at the IMA is a duplication of capability. As a result, there is no incentive to generate an IMA workload.

Exhibit Ia is a hot bench fabricated at the SIMA for support of the Mark XII IFF. Exhibit Ib is the ATE section at the SIMA. It contains the DIMOTE (AN/USM-422), shown in Exhibit IIa, and the GENRAD (AN/USM-465), shown in Exhibit IIb. Exhibit III is a photograph of the microminiature repair station.

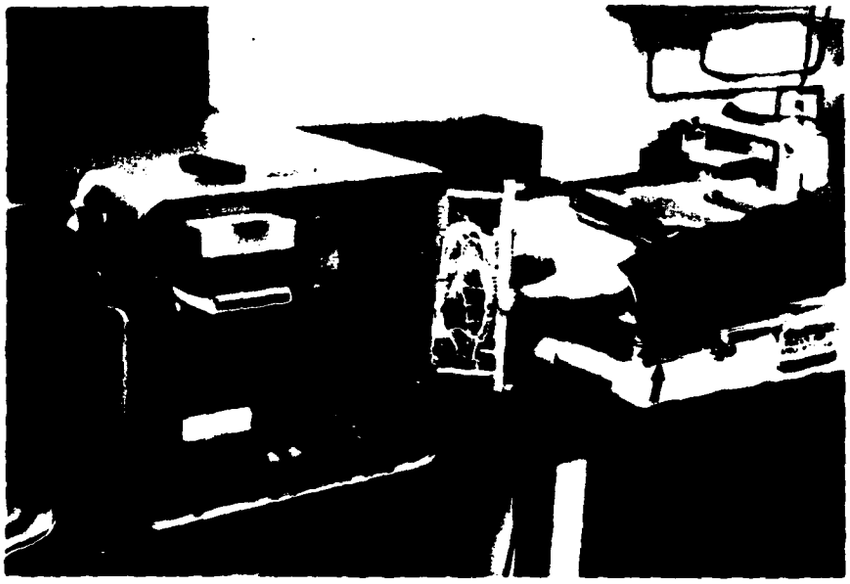
A catalog of available TPSs, and those systems for which some level of TPS development is underway, is published under the STEEP program. However, this quarterly publication does not tell what level of activity is planned or what the program scope will be. This publication provides the official status of the STEEP program and distribution is automatic. However, knowledge and use of STEEP is limited. The major feature of this publication is that it can be used for inventory purposes.

In summary, there appears to be only minor differences between the support and test equipment of an IMA compared to an organizational level maintenance activity. This condition is due to existing maintenance support and acquisition policies.

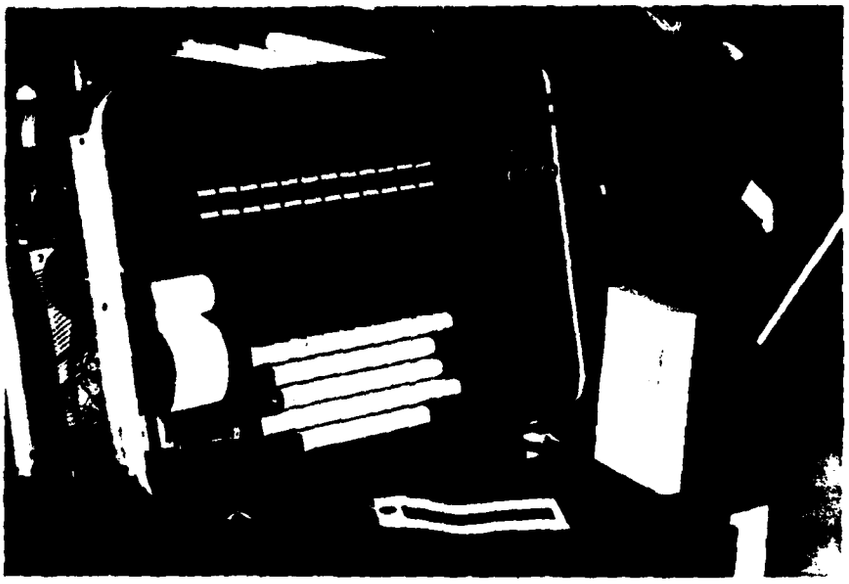


Ia. SIMA Mayport Hot Bench for IFF Fault Detection.

Ib. SIMA Mayport Automatic Test Equipment Section.

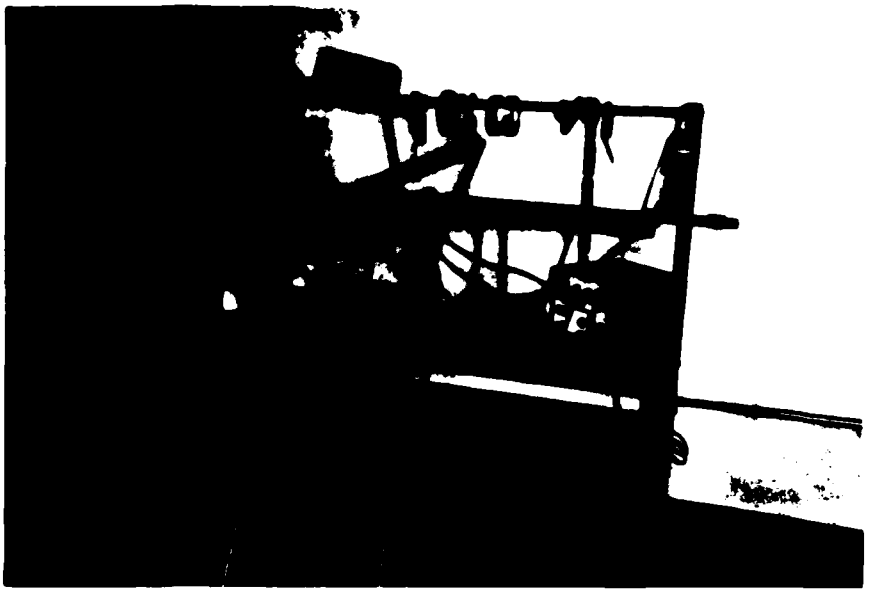


IIa. SIMA Mayport DIMOTE (AN/USM-422)



IIb. SIMA Mayport GERNAD (AN/USM-465)

EXHIBIT II



SIMA Mayport Micro Miniature Repair Station.

EXHIBIT III

5.5 SURVEY SECTION FIVE - SUPPLY SUPPORT

Section Five was designed to explore supply support at the IMA. The survey revealed that one of the largest single factors constraining the growth and responsiveness of the IMA W/C 67 support is the supply support policy that inhibits repair actions. This policy is predicated upon the fact that the IMA is not a Navy Stock Funded (NSF) activity. The findings of this survey indicate that the policies of repair/maintenance and supply do not always complement each other.

Due to the fact that SIMA Mayport is not a NSF activity it must pay for each replacement part used in the repair cycle. Therefore it is unable to:

1) Maintain an authorized allowance of repair parts (BASCAL).

2) Establish and maintain pre-expended bins for high usage, low cost items.

3) Maintain rotable pools.

4) Repair anything not covered by a work request from a funded activity.

The aforementioned factors severely limit the responsiveness of the IMA in effecting a repair action whenever a replacement part is required. Even consummable items such as resistors, capacitors and transistors require a separate supply request which greatly increases turn-around-time for repair of the end item. Often, the end item must be placed in an awaiting parts status until the piece-part is received from supply. Due to its low ordering priority, SIMAs have a distinct disadvantage on timely receipt of parts. If the failed end item requires a part with a 7 cog code, the end item must be returned to the owner without repair because the SIMA cannot pay for, or order, these items.

Without proper funding, rotable pools (end items or component parts) and pre-expended bin (high failure, low cost items), the three levels of maintenance concept cannot be realistically supported.

5.6 SURVEY SECTION SIX - MAINTENANCE DATA COLLECTION

It was the purpose of this section to determine how data is collected to record maintenance transactions and repair actions.

Specific questions concerning this area were:

1) Are all failures of equipment recorded?

2) Does data collection relate to a specific failure with the specific information relative to the failure?

3) How often do specific items fail?

4) Is the action taken and the part(s) required to fix the end item recorded?

5) Is the repair time recorded?

6) Is awaiting repair/parts time recorded?

7) Are test equipment availability/utilization rates recorded?

The basic data collection system, with regard to prime system failures, appears to be inadequate regarding the recording of all maintenance transactions. If a system fails to operate at the organizational level, attempts are made to repair the system onboard. If these attempts are successful, either by repair or replacement of a component, the only recorded action is a supply transaction. There is no requirement to complete a 4790/2K. No other documentation is required in this instance, as the failed part, a mandatory turn-in item or a consummable item, was either turned into supply or discarded.

If the system could not be repaired onboard, there are two additional options: 1) request assistance from the MOTU, which requires no 4790/2K paperwork, or 2) enter the problem into the CSMP and request IMA assistance. If option 1 is chosen and the MOTU is able to resolve the problem, no documentation is required. However, if option 2 is chosen, a 4790/2K/Q is required and an audit trail begins. This is the least attractive, and often avoided, option. Refer to figure A-2 to see the process for obtaining IMA assistance. The 4790/2K will cause a record to be created. It will record the equipment identification code (EIC) of the failed item, what is suspected to be wrong with the item (narrative form), how it was discovered (with very few options), the unit identification code (UIC) of the activity experiencing the problem, the job control number assigned to this work request and the point of contact for any additional information.

The completed 4790/2K/Q will not show:

1) Parts utilized to effect repair
2) Type of repair action required
3) Time period from failure to repair and return
4) Processing time at IMA
5) Fault isolation time
6) Fault correction time
7) Awaiting parts time and equipment status
8) Check out time and equipment used
9) Clean up and out processing time

Data not recorded or collected is considered to be significant data for analyzing potential system and equipment readiness problems. Significant system availability factors are ignored in the current maintenance data collection system.

5.7 SURVEY SECTION SEVEN - FACILITIES

The W/C 67 spaces, as indicated in figure A-3, are spacious and well designed with adequate room for expansion of repair capabilities. However, this may be irrelevant since presently IMAs do not appear to be considered as a viable option when maintenance concepts are planned for new electronics systems.

Exhibit IV shows two views of W/C 67A, the outside electronic repair center. Exhibit V shows two views of W/C 67B, the test equipment repair facility.

5.8 CONCLUSIONS/RECOMMENDATIONS

During the five day survey period, ample opportunity was afforded to examine the organization, capability, and operations of two IMAs. The survey team, having no connection with either IMA, is inclined to provide a truely objective analysis of survey results.

5.8.1 Conclusions

The personnel of SIMA Mayport are doing everything within their power to advertise and solicit business for W/C 67. Letters are produced telling of their capability, and visits are made to potential customers to solicit business. Their efforts exceed that normally expected and are considered commendable.

There are several factors that their self-help efforts will not overcome. One factor is the lack of a firm maintenance philosophy and concept which supports three levels of maintenance for electronics repair. Another factor is the prevailing philosophy that each ship must be an entity that can fully support equipment maintenance and repair to a depth equal to the IMA. Supply philosophies are oftentimes opposed to the SIMA's efforts to provide a responsive electronics maintenance/repair program for the operating forces.

This survey revealed that the IMA enjoys no special resources (support equipment, training, publications, etc.) over shipboard resources. However, the facilities and training available at SIMA Mayport are suitable for consideration of an expanded mission to provide a greater range and depth of repair capability resident at the intermediate level to support electronics maintenance for the operating forces. It is considered prudent to note that large increases in workload would require commensurate manning increases.

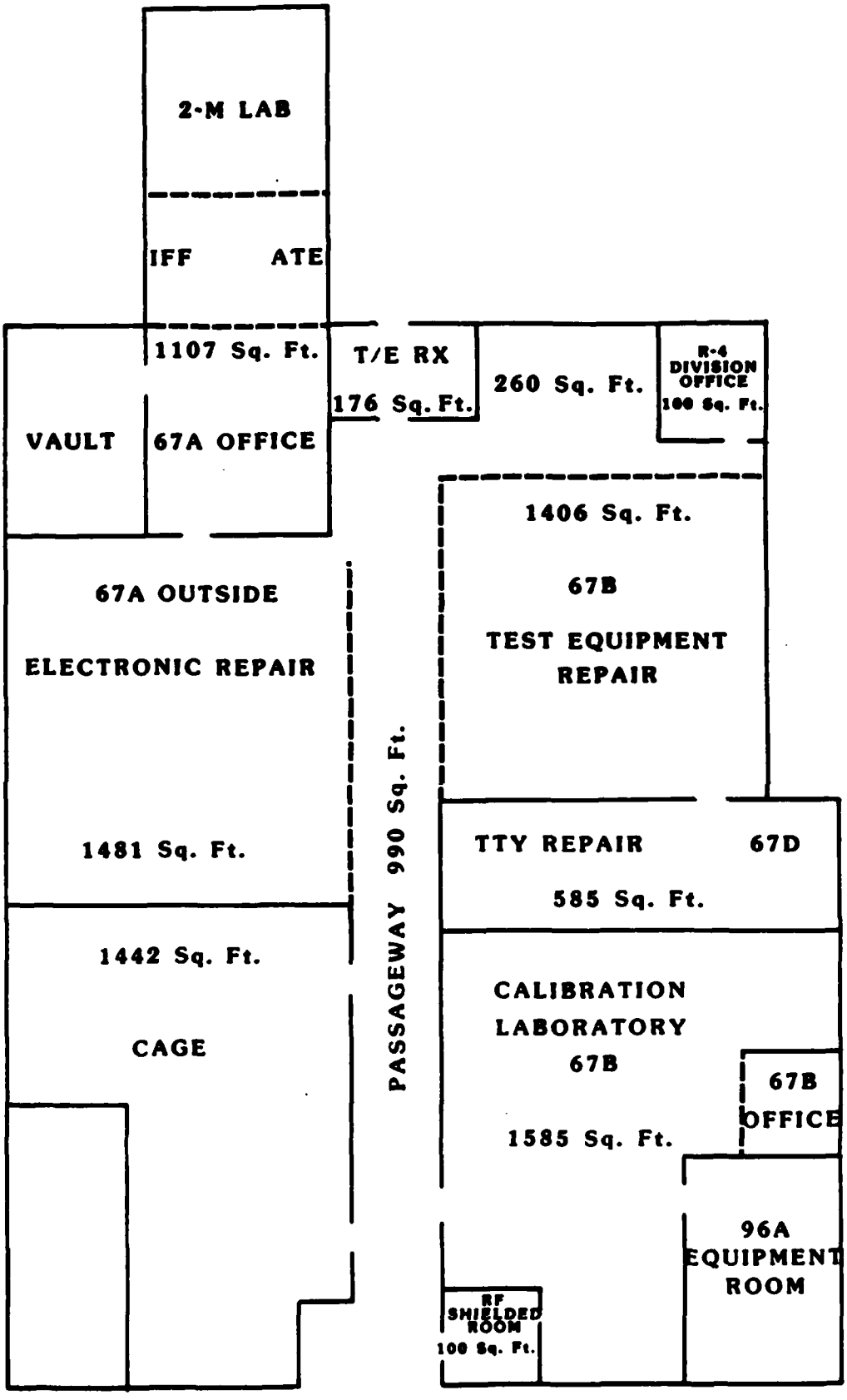
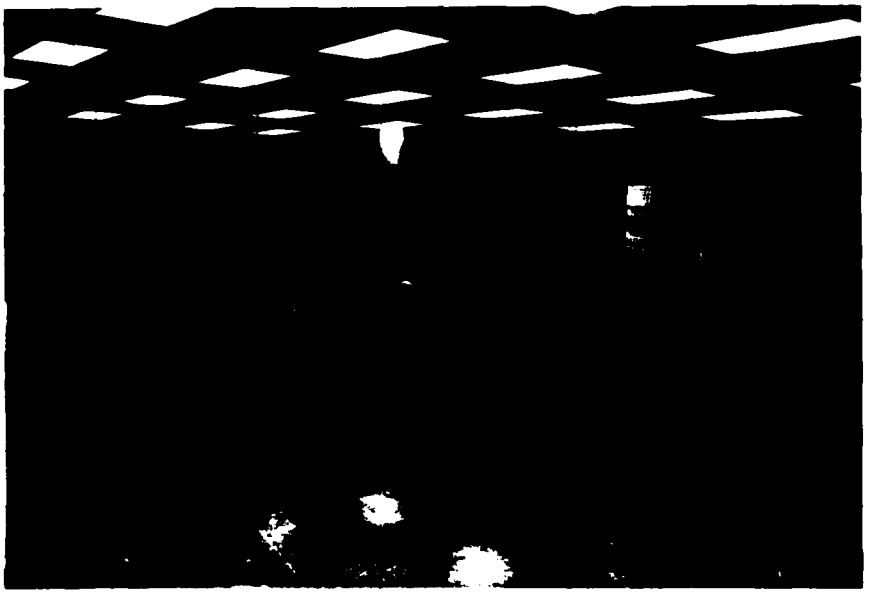


FIGURE A-3

SIMA MAYPORT WORK CENTER 67 SPACES

Two Views of SIMA Mayport Work Center 67A.

EXHIBIT IV



Two Views of SIMA Work Center 67B.

EXHIBIT V

The major factors inhibiting the enhancement of IMA productivity are:

1) Lack of early maintenance planning to introduce IMA support and the attendant logistic resources required for the IMA (e.g., training, publications, support equipment).

2) Early maintenance/support planning does not address a viable three level support program based on LORA findings.

3) Existing supply policy is generally directed towards Depot level repair for repairables.

4) IMA repair is not identified in the SM&R code assignments for repairable electronic components.

In response to a specific question on relative ranking of factors that constrain the capabilities of the IMA, it was noted that funding and supply support ranked equally for the position of being the most significant factor and SM&R code assignment was ranked as the least significant factor. Training, manpower, technical documentation and overall maintenance practices had mid-scale rankings.

5.8.2 Recommendations

The recommendations cited below are divided into short and long term categories. The long term policies address acquisition strategies and future planning while the short term recommendations are directed at relatively inexpensive changes that can be put into place with directives and intense management of available assets.

5.8.2.1 Short Term Recommendations

1) Institutionalize guidelines defining the three levels of maintenance for electronics equipments. Demand adherence.

*2) Establish/re-equip IMAs and assign them prime responsibility for the repair of specific systems/components.

*3) Establish an Individual Component Repair List (ICRL) for each IMA and preposition suitable resources (e.g., training, publications, support equipment) to fulfill the mission. The Master Repair Capabilities Listing used at SIMA Mayport is a step in the right direction.

*4) Revise the Master Repairable Items List (MRIL) based on SM&R codes citing which IMA has the capability for the maintenance and repair of specific equipment, down to the lowest indenture of repairable assembly. Obtain TYCOM concurrence, and ensure compliance by all user activities.

* Requires a change to existing SM&R code assignments.

5) Establish rotable pools at designated IMAs to be responsive to fleet needs in terms of boxes, components and/or shop replaceable assemblies. Collect all printed circuit boards, modules, etc., that are routinely hoarded or discarded and induct at the IMA for check and test before disposal.

6) Establish and publish a screening and limited repair capability list that is based on SM&R codes for all items regardless of ultimate disposition/condemnation instructions.

7) Revise existing supply and maintenance policies to allow the IMA the same supply ordering priority as the user.

8) Revamp the 4790/2K and its use to provide a greater range of data collection in order to be truly reflective of actual failures, repair actions, parts usage, etc.

5.8.2.2 Long Term Recommendations

1) Ensure that full IMA support is considered early in the acquisition cycle as a viable maintenance/support concept by using LSA.

2) Utilize LORA for all acquisitions to determine the most economic level of repair.

3) Standardize procurement policies. Consolidate all disciplines into one unit with total responsibility for all ILS elements that represent standard packages based on an institutionalized support concept.

4) Establish a requirement for "designing in" testability and accessability to be compatible with planned IMA capabilities.

6.0 PLANNING FOR THREE LEVELS OF MAINTENANCE

Figure A-4 depicts a generic POA&M to implement three levels of maintenance. The following paragraphs discuss how early planning for intermediate level maintenance should be performed and how, in actuality, it is performed.

6.1 GENERIC POA&M TO IMPLEMENT INTERMEDIATE LEVEL MAINTENANCE

As illustrated in figure A-4 the key to planning for IMA maintenance, and ensuring that adequate resources are positioned at the IMA, is early planning. This planning is accomplished at the systems commands (NAVELEX and NAVSEA) during the system acquisition process. This planning must be initiated even before hardware is manufactured. A determination is made by a LORA as to which are the most economical level of repair alternatives. This occurs approximately at the same time as the physical configuration audit

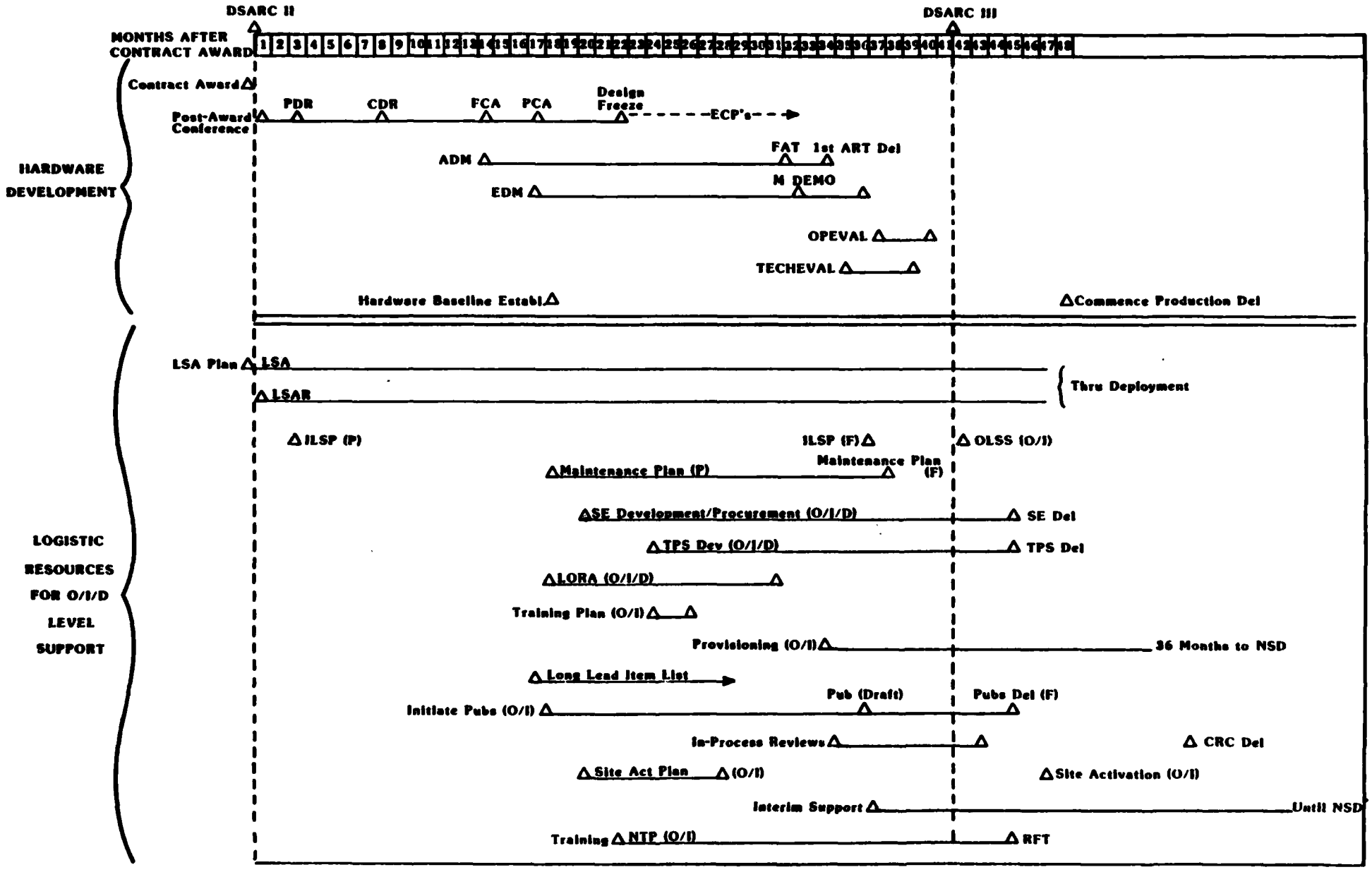


FIGURE A-4

GENERIC POA&M TO IMPLEMENT THREE LEVELS OF MAINTENANCE

which establishes the hardware baseline. The results of the LORA and resultant support decisions, are documented in the maintenance plan that provides the basis for all subsequent logistic planning. Planning for each element of logistics is then initiated. These element are: supply support, support and test equipment, training, technical publications, manpower and personnel, facilities, and computer resources support. An important part of this process is the assignment of SM&R codes to all repairables, which indicates which level of maintenance is authorized to remove, repair and/or discard the item. Provisioning is also performed in support of these SM&R codes. The objective is to have support planned, developed, procured and positioned at the designated maintenance activities at the same time the new hardware is introduced into the fleet.

The results of this study indicate that IMAs are not fully utilized for electronics repair because of a lack of this early planning. Organizational and depot levels of maintenance are planned for and equipped. Consequently, adequate resources are not in-place at IMAs to meet fleet needs. It is difficult to remedy this lack of planning after the fact.

6.2 ACTUAL PLANNING FOR INTERMEDIATE LEVEL MAINTENANCE

The results of this study indicate a two-fold problem with planning for intermediate level electronics repair. One, intermediate level maintenance is neglected as a support level different from organizational level in the early planning stages. IMAs are not designated to provide maintenance, are not identified in the SM&R code assignments, and are therefore not utilized by fleet operating activities. IMAs must solicit work categorized as electronics repair of equipments and components.

The second problem is that even if intermediate level maintenance is considered early in the planning stages, and identified for a particular system or equipment, the IMA must be provided special resources (more specialized than organizational level) to effect specialized maintenance. There seems to be little inclination towards providing IMAs with SE/ATE more sophisticated than that assigned to organizational level, or establishing special intermediate level repair training for ETs, or procuring special technical documentation, etc.

After a maintenance strategy is established for a particular system or equipment it is difficult to modify the strategy to include viable IMA support. Each logistic element (publications, training, support equipment, supply support) would need to be re-assessed to accommodate the change.

IMA support must be planned early and must be given resources enabling it to effect more sophisticated maintenance than is available at the organizational level. Only when these two issues are resolved will IMAs be a viable part of the three levels of maintenance concept.

6.3 EXPANSION OF IMA CAPABILITY FOR IN-USE EQUIPMENTS

For existing electronics systems, the prevailing maintenance concept of organizational to depot maintenance is not based on the results of LSA or LORA. Further, a small representative sampling of findings from project audits, conducted during the 1983 - 1984 time frame, are presented below to illustrate that the "O" to "D" concept for electronic systems will probably continue ad infinitum.

Project (Cognizance)	Finding
AN/SQS-53C (PMS-411)	The maintenance concept in the ILSP excludes the intermediate level of maintenance on GFE.
MK 92 FCS (SEA-62Z22)	Maintenance concept was developed consistent with the LO-MIX philosophy of FFG-7's - remove/replace of faulty modules at "O" level and repair of modules at "D" level. "I" level maintenance was not established.
CIWS BLK 1 (SEA-62Y3)	High false return rate being experienced on modules returned to depot. Screening of PCBs available at SIMA on GENRAD 2225 - not routinely utilized.
FFG-7 Fin Stab Sys (SEA-06C1C)	No current plans to use AN/USM-465 module testers for screening or fault diagnosis of PCBs at "I" level.
AN/WSN-3A(V)2 ESGN (SEA-61Z21)	Functionally Oriented Maintenance Manual (FOMM) procedures may generate retrograde of "Good" in lieu of "Bad" modules or components to "D" level.
SUBPACS (PMA-409)	Tender requirements are not included in LSA. Recommend conduct examination of maintenance tasks to be performed by tenders to ensure that parts and consumables required by IMA are available in sufficient range and depth.
CSA MK2 Mod 0 (SEA-63Y3)	2M repair and ATE capability is not being considered for "I" or "O" level.

However, as has been demonstrated on the MARK-12 IFF System, intermediate level repair capability can be successfully implemented for existing systems. A list of candidate electronics systems was presented, as part of a questionaire, during the March 1985 IMA Managers Conference held in San Diego, California. This list of systems is presented below for information purposes only.

CANDIDATE EQUIPMENT LISTING

AN/SLQ-17&32	AN/URT-23, 24
AN/WLR-1, 8	AN/WRC-1
AN/ULQ-6	AN/WRT-2
AN/USH-26	R-390/URR
SSR-1 Flt B Cart	R-1051/URR
AN/WSC-3V	AN/VRC-46
NBSV	AN/SRR-19
AN/SLA-10	AN/WRR-3
AN/GRR-23	AN/SYQ-7
AN/GRT-21	AN/APX-72
AN/SRA-33	AN/UPX-23, 27
AN/SRC-20, 21	AN/URN-20
AN/URC-9, 82	AN/SKR-4
OA-9123	AN/SRN-12, 19
AN/URR-27	AN/URD-4

In summary, as conditions warrant, it is feasible to identify and backfit the required logistics resources at designated intermediate level activities (SIMAs/Tenders) to implement three levels of maintenance on a system by system basis. The necessary analyses would, in almost all instances, require the running of a LORA to determine the cost effectiveness of implementing intermediate level repair capability for each candidate system. As a minimum, emphasis should be directed towards increased utilization of existing 2M and ATE capabilities already in-place at SIMAs and Tenders.

ATTACHMENT B

INSTRUCTIONS REVIEWED

RELEVANT TO IMAS

ATTACHMENT B

INSTRUCTIONS REVIEWED RELEVANT TO IMAS

The following instructions and documents have been collected and reviewed:

1. OPNAVINST 4790.4, The Ships Maintenance and Material Management (3M) Manual

2. NAVELEXINST 4700.10B, Levels of Equipment Maintenance in the Naval Electronic Systems Command; policy governing

3. NAVMATINST 4400.14B, Navy Repairables Management Manual

4. P-485, Afloat Supply Procedures

5. NAVMATINST 4440.48, Policy and Procedures for Establishment of Ship Operational Support Inventory

6. OPNAVINST 4700.7F, Maintenance of Ships; policies and procedures

7. ST820-AA-CAT-010/ATE EM/PCB CAT, Catalog of Automatic Testing Capability for Electronic Modules/Printed Circuit Boards

8. NAVPERS 18068D, Navy Enlisted Manpower and Personnel Classifications and Occupational Standards

9. NAVSUPINST 4423.14B, Naval Material Command (NMC) Uniform Source, Maintenance and Recoverability (SM&R) Codes

10. NAVELEXINST 4700.13, Establishment of Naval Electronics Systems Command Uniform Maintenance Concept for Electronic Material

11. SURFLANTINST 9000.1A, NAVSURFLANT Maintenance Manual

ATTACHMENT C

ACRONYMS

ATTACHMENT C

ACRONYMS

ACR	Allowance Change Request
AD	Destroyer Tender
ADP	Automatic Data Processing
AEL	Allowance Equipment List
AMMIS	Area Maintenance Management Information System
APL	Allowance Parts List
AR	Repair Ship
ARO	Assistant Repair Officer
ARRS	Analysis Records and Reports Section
AS	Submarine Tender
ATE	Automatic Test Equipment
AWM	Awaiting Maintenance
AWP	Awaiting Parts
BIT	Built-In Test
BITE	Built-In Test Equipment
CASREP	Casualty Report
CDR	Critical Design Review
CID	Component Identification
CINCLANT	Commander-In-Chief Atlantic Fleet
CG	Guided Missile Cruiser
COMNAVELEX	Commander Naval Electronic Systems Command
COMNAVSURFLANT	Commander Naval Surface Force Atlantic Fleet
COSAL	Coordinated Shipboard Allowance List
CV	Aircraft Carrier, Conventional

CSMP	Current Ships Maintenance Project
DDG	Guided Missile Destroyer
D-Level	Depot Level of Maintenance
DLR	Depot Level Repairable
DMISA	Depot Maintenance Interservice Support Agreement
DOD	Department of Defense
DOP	Designated Overhaul Point
DS	Data Systems Technician
DWGS	Drawings
EIC	Equipment Identification Code
EM	Electronic Module
EMI	Electro-Magnetic Interference
EOC	Engineered Operating Cycle
ETV	Engineered Time Value
EW	Electronic Warfare Technician
FCA	Functional Configuration Audit
FECL	Fleet Electronic Calibration Laboratory
FF	Frigate
FFG	Guided Missile Frigate
FLR	Field Level Repairable
FMAG	Fleet Maintenance Assistance Group
FMP	Fleet Modernization Program
FSN	Federal Stock Number
GPETE	General Purpose Electronic Test Equipment
I-level	Intermediate Level of Maintenance
ILS	Integrated Logistic Support

IMA	Intermediate Maintenance Activity
IMAV	IMA Availability
IMMS	Intermediate Maintenance Management System
IUC	Intermediate Unit Commander
JSN	Job Sequence Number
LOR	Level of Repair
LSA	Logistic Support Analysis
LWC	Lead Work Center
2M	Miniature/Microminiature (Maintenance Program)
3M	Maintenance and Material Management System
MaPl	Maintenance Plan (Prime Equipment or Support Equipment)
MDCO	Maintenance Document Control Office
MDCS	Maintenance Data Collection System
MIR	Master Index of Repairables
MIRCS	Mechanical Instrument Repair and Calibration Shop
MMH	Maintenance Man-Hour
MOTU	Mobile Training Unit
MP	Maintenance Plan
MRC	Maintenance Requirement Card
MRIL	Master Repairable Item List
MSDP	Maintenance System Development Program
NAVELEX	Naval Electronic Systems Command
NAVSEA	Naval Sea Systems Command
NAVSURFLANT	Naval Surface Force Atlantic Fleet
NEC	Navy Enlisted Classification (Code)

NRFI	Not Ready for Issue
NSC	Naval Supply Center
O-Level	Organizational Level of Maintenance
OAL	Ordnance Allowance List
OAEL	Ordnance Allowance Equipment List
OJT	On-the-job Training
OPNAV	Office of the Chief of Naval Operations
P&E	Planning and Estimating Section
PCA	Physical Configuration Audit
PCB	Printed Circuit Board
PDR	Preliminary Design Review
PDLR	Progressive Depot Level Repairable
PMS	Planned Maintenance System
RAV	Restricted Availability
RFI	Ready for Issue
RFP	Request for Proposal
RO	Repair Officer
ROH	Regular Overhaul
RSG	Readiness Support Group
SCAT	Sub Category Code
SE	Support Equipment
SEM	Standard Electronic Module
SIMA	Shore Intermediate Maintenance Activity
SM&R	Source, Maintenance and Recoverability (Code)
SPETERL	Ships Portable Electrical/Electronic Test Equipment Requirements List
SRA	Selected Restricted Availability

SSIP	Ship Support Improvement Project
STEEP	Support and Test Equipment Engineering Program
TE	Test Equipment
TECH ASSIST	Technical Assistance
TPI	Test Program Instruction
TPS	Test Program Set
TYCOM	Type Commander
UUT	Unit Under Test
W/C	Work Center

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